

NOV 9 2000

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

In the Matter of

Revision of the Commission's Rules  
To Ensure Compatibility with  
Enhanced 911 Emergency Calling Systems

CC Docket No. 94-102

**JOINT SPRINT PCS  
PHASE II IMPLEMENTATION REPORT**

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November 9, 2000

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**JOINT SPRINT PCS  
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Sprint Spectrum L.P., d/b/a Sprint PCS ("Sprint PCS"), on behalf of itself and the other firms providing commercial mobile radio service ("CMRS") under the Sprint PCS brand name (collectively, "Sprint PCS"),<sup>1</sup> hereby submits this Report regarding its implementation of wireless E911 Phase II automatic location identification ("ALI").<sup>2</sup>

**I. Introduction**

The Commission's Phase II E911 mandate requires CMRS carriers to provide precise location of its customers to any requesting Public Safety Answering Point ("PSAP"). The technological challenges to the development of such a system are phenomenal. The administrative, logistical, and financial issues are even more formidable. Nonetheless, Sprint PCS has prepared a compliance strategy that will meet the Commis-

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<sup>1</sup> The companies participating in this report are listed in Appendix A.

<sup>2</sup> See 47 C.F.R. § 20.19(i); *Fourth E911 Memorandum Order*, CC Docket No. 94-102, FCC 99-326, at ¶¶ 78-81 (Sept. 8, 2000). See also *Public Notice*, "Wireless Telecommunications Bureau Provides Guidance on Carrier Reports on Implementation of Wireless E911 Phase II Automatic Location Identification," DA 00-2099 (Sept. 14, 2000) ("Bureau Guidance Public Notice").

sion's mandate and provide, in cooperation with the PSAP community, unparalleled safety coverage for its customers.<sup>3</sup>

Sprint PCS has invested substantial resources seeking a means to comply with the Commission's Phase II mandate. After evaluating multiple technologies, participating in joint testing of several proposed systems, holding numerous discussions with manufacturers regarding pricing and delivery, assessing the time constraints that the Commission imposed, and weighing the financial impacts on the company, Sprint PCS believes the best alternative for its Phase II compliance is ALI-capable handsets.<sup>4</sup> Specifically, Sprint PCS plans to introduce assisted GPS handsets in sufficient quantities to meet the Commission's handset implementation guidelines, and it will install the necessary network infrastructure to support these handsets.<sup>5</sup>

Although Sprint PCS is committed to a handset-based implementation strategy, any plan involving the roll out of a new and largely untested technology must be subject to several caveats. Sprint PCS does not manufacture the handsets used on its system, the base station transceivers ("BTS") that must interact with the handsets, the switching equipment that routes traffic, the position determining equipment ("PDE") that calculates location, or the mobile positioning center ("MPC") that will interface with the PSAPs.

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<sup>3</sup> The safety benefits to the end user will, of course, rely not only on Sprint PCS' implementation of a location tracking system but also on the ability of PSAPs and LECs to upgrade their existing 911 networks to receive this information.

<sup>4</sup> Sprint PCS proposed a hybrid system for the delivery of location information, as FCC orders appeared to permit. *See* Sprint PCS Petitions, Docket No. 94-102, dated February 4, 1999 and December 6, 1999. This hybrid approach would have relied upon Advanced Forward Link Triangulation technology, similar to the EOTD proposal made by VoiceStream, while also offering more precise location capability through GPS handsets. The FCC denied Sprint PCS' proposal. *See Fourth E911 Memorandum Order*, CC Docket No. 94-102, FCC 99-326 (Sept. 8, 2000).

<sup>5</sup> Sprint PCS continues to believe that AFLT technology is a promising means of meeting the FCC's desired goals. However, Sprint PCS will not rely on AFLT as its means of compliance.

While it has placed orders or is in the process of negotiating contracts with its vendors, Sprint PCS does not control the manufacturing timeline and therefore cannot ensure that some technological problem will not delay deployment. Accordingly, Sprint PCS is explicitly reserving the right to modify the strategy outlined in this report as warranted by changing conditions.

## **II. Background/Contact Information**

Sprint Spectrum L.P. is the primary operating company through which Sprint PCS offers CMRS service. The TRS number for Sprint Spectrum L.P. is 811754. Other entities filing in conjunction with Sprint Spectrum L.P. are identified in Appendix A.

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## **III. E911 Phase II Location Technology Information**

Sprint PCS below provides the information that the Wireless Bureau identified in its September 14, 2000 *Guidance Public Notice*.

### **1. Type of Technology**

Sprint PCS will implement a single national strategy for compliance with the Phase II mandate: handset-based ALI capability. Although Sprint PCS continues to investigate the implementation of Advanced Forward Link Triangulation (“AFLT”) and believes that AFLT may ultimately satisfy the Commission’s location requirements,

Sprint PCS also plans to deploy assisted GPS handsets in sufficient quantities to meet the Commission's proposed penetration levels.

At the present time, assisted GPS handsets appear to provide the greatest accuracy of any location system currently proposed for CDMA carriers. Assisted GPS operates by collecting data from multiple sources to calculate location with greater precision. The handset collects ranging information from satellite signals as well as timing and pilot phase information from the messaging process inherent in an IS-95 CDMA system. These measurements are then transmitted through the network to a regional platform containing Position Determining Equipment ("PDE"). The PDE calculates location and provides the relevant information to the Mobile Positioning Center ("MPC"), which acts as an interface with the public switched telecommunications network ("PSTN") and the PSAPs.

The development of this assisted GPS system will require the interaction of equipment manufactured by multiple vendors, including handset manufacturers, BTS manufacturers, switching equipment manufacturers, PDE equipment manufacturers, and MPC equipment manufacturers. Handset manufacturers will be required to integrate the necessary GPS chipsets into their product lines over time. The precise mix of handset vendors will depend upon the ability of manufacturers to meet the FCC's deadlines, pricing, and other factors unrelated to Phase II deployment. At this time, Sprint PCS purchases handsets from eight different vendors.<sup>6</sup>

Sprint PCS has requested that the manufacturers of its BTS and switching equipment integrate the hardware and software necessary to interact with assisted GPS hand-

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<sup>6</sup> These handset vendors include Denso, Kyocera, LGIC, Motorola, Neopoint, Nokia, Samsung, and Sanyo.

sets. Sprint PCS' current vendors of BTS and switching equipment are Lucent Technologies, Nortel, Samsung and Motorola. Although one of these vendors has expressed reservations regarding its ability to meet the Commission's deadlines, Sprint PCS continues to push its vendors to meet the Commission's mandate.

## **2. Testing and Verification**

Sprint PCS and Lucent Technologies conducted joint tests to validate the accuracy of assisted GPS technology. The tests were conducted using Lucent and Qualcomm prototype mobiles. The hardware used was a prototype PDE which consisted of a Windows 95 computer connected to a 24 correlator GPS receiver, a timing card/reference, and a GPS antenna with a clear view of the sky. With one exception, all the algorithms used to determine positions for the Lucent and Qualcomm mobiles were identical.

The tests involved twelve scenarios in four environments. The scenarios are a subset of test conditions recommended by the CDMA Development Group.<sup>7</sup> The chosen scenarios reflect locations where users typically make emergency calls. The four environments are rural, suburban, urban, and dense urban. The split in the percentage of calls is based on assumptions of the relative number of emergency calls from the various scenarios. Sprint PCS defined dense urban as locations where buildings are ten or more stories in height. Figure 1 presents the scenarios and their test environments.

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<sup>7</sup> The CDMA Development Group, or CDG, is a consortium of companies that have joined together to help ensure interoperability among different CDMA systems and to develop test methodologies for new capabilities or technologies. See [www.cdg.org](http://www.cdg.org). See also *Guidelines for Testing and Verifying the Accuracy of Wireless E911 Location Systems*, OET Bulletin No. 71 (April 12, 2000).

Fig. 1 – Scenarios and Environments with Percent Usage

Scenarios		Environment							
		Rural		Suburban		Urban		Dense Urban	
		67%	95%	67%	95%	67%	95%	67%	95%
1	Inside car: stationary	20.0%	20.0%	12.5%	12.5%	20.0%	20.0%	15.0%	15.0%
2	Inside car: 30 mph (10 mph urban/dense urban)	20.0%	20.0%	12.5%	12.5%	10.0%	10.0%	15.0%	15.0%
3	Inside car: 55 mph (max speed limit)	20.0%	20.0%	12.5%	12.5%				
4	Inside residence: 1st floor of 2 story house	20.0%	20.0%	12.5%	12.5%				
5	Inside shopping mall			12.5%	12.5%	20.0%	20.0%	15.0%	15.0%
6	Inside 2-3 story office building: interior location			12.5%	12.5%				
7	Multi-story parking garage: center, 2 floors from top			6.3%	6.3%	5.0%	5.0%		
8	Multi-story parking garage: see #7, 4-8 hours later			6.3%	6.3%	5.0%	5.0%		
9	Inside middle floor of 25-50 story building					20.0%	20.0%	20.0%	20.0%
10	Outside urban canyon: 25-50 story bldgs, 4-lane street					20.0%	20.0%	35.0%	35.0%
11	Outside pedestrian: suburban sidewalk			12.5%	12.5%				
12	Outside stationary: 1 BS with mountain blockage	20.0%	20.0%						

The processed test results are presented in figure 2.

Fig. 2 - Location Technology Trials Test Results

Scenarios		Rural		Suburban		Urban		Dense Urban	
		67%	95%	67%	95%	67%	95%	67%	95%
1	Inside car: stationary	19	33	19	33	20	40	40	81
2	Inside car: 30 mph (10 mph urban/dense urban)	28	137	28	137	29	144	49	185
3	Inside car: 55 mph (max speed limit)	56	274	56	274				
4	Inside residence: 1st floor of 2 story house	17	30	17	30				
5	Inside shopping mall (Kansas City Trial 12/99)			27	47	28	54	48	95
6	Inside 2-3 story office building: interior location			23	45				
7	Multi-story parking garage: center, 2 floors from top			12	36	13	43		
8	Multi-story parking garage: see #7, 4-8 hours later			13	43	13	43		
9	Inside middle floor of 25-50 story building					45	71	89	143
10	Outside urban canyon: 25-50 story bldgs, 4-lane street					22	47	36	70
11	Outside pedestrian: suburban sidewalk			4	7				
12	Outside stationary: 1 BS with mountain blockage	17	23						
5 point Overall Accuracy (67% and 95% in meters)		27	99	23	77	27	61	51	107

For scenario 1, all environments were tested using prototype equipment. The first scenario provides a baseline to enable data extrapolation for untested scenarios. A straightforward extrapolation is applied by taking the difference between, for example, the urban and suburban cases and using that offset to predict other urban scenarios which already have suburban data. Once statistically reliable relationships can be determined, more robust methods can be used to predict results in untested cases. Suburban and rural scenarios were performed in Morris and Union Counties in New Jersey. Some urban tests were done in Whippany and Morristown, New Jersey. Dense urban tests were per-



formed in midtown Manhattan. Additional urban tests were conducted in Washington, D.C.

Based upon these measurements, Figure 3 below shows the estimated accuracy results based on these prototype measurements for the Sprint PCS CDMA network. Based on 911 calls from the different environments, the following percentages have been determined. Using those percentages, Sprint PCS has calculated an overall 67% and 95% accuracy estimation.

**Fig. 3 – Estimated Accuracy Results Based on Prototype Measurements for the Sprint PCS CDMA network**

<b>Environment</b>	<b>Rural</b>		<b>Suburban</b>		<b>Urban</b>		<b>Dense Urban</b>		<b>Overall Network</b>	
	67%	95%	67%	95%	67%	95%	67%	95%	67%	95%
5 point Overall Accuracy (67% and 95% in meters)	27.40 Meters	99.40 Meters	23.31 Meters	76.56 Meters	27.20 Meters	61.10 Meters	50.84 Meters	107.14 Meters	-	-
Estimated Mix of 911 calls	15.0%		64.0%		13.0%		8.0%		27 Meters	80 Meters

### **3. Implementation Schedule**

Implementation of Sprint PCS' Phase II compliance plan requires the manufacture and sale of new handsets, the modification of the existing network infrastructure, and the construction of PDE and MPC platforms. The development of each of these elements of the network is interdependent. For example, because network infrastructure cannot be tested until handsets are manufactured, a delay in the handset roll out could delay the implementation of network modifications. Conversely, handsets cannot be manufactured in mass quantities until they have been tested on network prototypes.

Attached as Appendix B is a spreadsheet showing the key tasks that must be completed before Phase II service can be implemented and the target dates for each task to be

completed. Because the majority of these items are beyond the control of Sprint PCS, no assurance can be given that the timetable will not slip. For example, Sprint PCS has serious concerns over the availability of sufficient handsets to meet the 25% percent penetration rate in light of the conversion of CDMA networks to third generation technologies ("3G") over the same time period. In addition, certain network vendors have cautioned that they may be unable to deliver equipment with sufficient time for Sprint PCS to deploy within the FCC's timeline. However, Sprint PCS is making all reasonable efforts to conform to the attached schedule that meets the FCC's requested implementation deadlines.

#### **4. PSAP Interface**

Sprint PCS will create a Mobile Positioning Center ("MPC") platform to interface with the PSTN and the PSAP community. The ability of PSAPs to receive information from the MPC will be dependent upon the CPE equipment they use as well as the infrastructure of their E911 network (*e.g.*, selective router/E911 tandem), network equipment often maintained by incumbent local exchange carriers ("ILECs"). There is no doubt that the transmission and interpretation of latitude and longitude information will present a formidable challenge to PSAPs and their E911 network agents (*e.g.*, ILECs). Given the hurdles that Sprint PCS has been able to overcome to generate precise location information, however, Sprint PCS expects that the PSAPs and ILECs will be able to overcome the difficulties associated with receiving this information.

To accommodate the transmission of Phase II data, PSAPs will need validate that their existing 911 networks are capable of receiving the data. PSAPs (or their network agents) may need to upgrade their selective router/tandem, their CPE and the trunking

facilities within their 911 network. Both the PSAP and its network agents must be able to support either SS7/ISUP signaling, to accommodate call associated signaling (“CAS”) routing, or SS7 or Enhanced MF signaling, to support non-call path associated signaling (“NCAS”) routing.

Regardless of the signaling/routing solution, the PSAPs will also be required to upgrade their CPE to accept latitude and longitude coordinates and to convert that data into a usable format for display on the call taker’s work station. In addition, facilities and capabilities between the PSAP and its ALI database may need to be upgraded in order to pass the latitude and longitude. The ALI database utilized by the PSAP must also be upgraded to perform dynamic updates of a 911 caller’s location position and to support two-way communications with the Mobile Positioning Center (“MPC”) within the wireless networks. Finally, it will be necessary for these ALI databases to be able to launch location queries to Sprint PCS’ MPC in order for the PSAP to receive the most accurate and current location of the 911 caller.

Sprint PCS is moving forward with the requirements within its network to support Phase II. Sprint PCS is optimistic that many PSAPs and their agents (*e.g.*, ILECs, ALI database providers) are also making the necessary investment in their own equipment. Those PSAPs that have not begun upgrading their networks will need to begin immediately if they intend to support Phase II wireless location information. Given the difficulties identified in rolling out Phase I service, Sprint PCS encourages PSAPs and their agents to begin the upgrades to their equipment as soon as possible.

## **5. Existing Handsets**

Sprint PCS will rely on two factors to drive penetration of ALI capable subscriber equipment. First, customers presently upgrade/change their handsets at an approximate interval of 18-21 months. This provides a natural decay of “legacy” subscriber equipment. Second, Sprint PCS will continue to incorporate new features for the marketplace to encourage the purchase of new handsets. As each generation of new features is launched, subscribers are given greater incentives to purchase new equipment. The power of this incentive is reflected in the fact that the original handsets Sprint PCS sold when it launched service in November of 1996 represent less than 2% of those handsets in use today.

## **6. Location of Non-Compatible Handsets/Roamers**

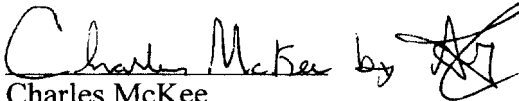
The handsets and network infrastructure that Sprint PCS will deploy in order to comply with the Commission’s E911 Phase II mandate will adhere to the TIA/ANSI IS-801 standard for messaging between CDMA handsets and networks. Standards-based handsets that are both ALI-capable and that are capable of roaming onto the Sprint PCS network will also be expected to adhere to this standard. Where only cell/sector information is available from a legacy or a roaming handset calling 911, the information will be delivered using the Phase II mechanism, giving the latitude and longitude of the cell/sector serving the caller. PSAPs upgrading to Phase II E911 will receive location information in accordance with J-STD-036, providing full compatibility for all handset types.

#### **IV. Conclusion**

Sprint PCS is pleased to set forth a compliance plan that satisfies the Commission's Phase II mandate. Although this plan is necessarily contingent on many factors, Sprint PCS has overcome seemingly insurmountable technological, administrative, and financial hurdles to reach this point. Undoubtedly, numerous technical and implementation issues will arise over the next few years, and PSAPs and their network agents still have much work to do. Ultimately, however, Sprint PCS customers will have unprecedented location information and safety features.

Respectfully submitted

**Sprint Spectrum L.P. d/b/a Sprint PCS**

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November 9, 2000

## **Appendix A**

### **List of Firms Covered by the Sprint PCS E911 Phase II Implementation Report**

















Numerous entities provide commercial mobile radio service under the Sprint PCS brand. Most Sprint PCS service is provided pursuant to PCS licenses held by the following Sprint Corporation affiliates: Wireless Co., L.P., SprintCom, Inc., PhillieCo. L.P., Cox PCS License, L.L.C., and APC PCS, LLC. Service is provided by Sprint Spectrum L.P., as the operating company under the control and direction of each of the listed licenseholders.

In addition, in certain markets, Sprint PCS service is provided by firms that manage networks on Sprint PCS' behalf using Sprint spectrum. These network managers include: AirGate PCS, Inc., Alamosa Wisconsin Limited Partnership, Bright Personal Communications Services, LLC, Enterprise Digital PCS, L.L.C., Enterprise Wireless, L.L.C., Georgia PCS Management L.L.C., Gulf Coast Wireless Limited Partnership (formerly Meretel Limited Partnership), Horizon Personal Communications, Inc., Independent Wireless One Corporation, iPCS Wireless, Inc., Louisiana Unwired LLC, Northern PCS Services, LLC, Roberts Wireless Communications, L.L.C., Shenandoah Personal Communications Company, Southwest PCS, L.P., Texas Telecommunications, L.P., Texas Unwired, UbiquiTel Operating Company, and Washington Oregon Wireless, LLC.

Finally, in certain markets Sprint PCS service is provided by firms holding their own radio licenses. The firms in this category include VIA Wireless, LLC (formerly, Central Wireless Partnership), Louisiana Unwired, LLC and Brookings Municipal Utilities (d/b/a Swiftel Communications). All of the above identified entities are adopting Sprint PCS' joint compliance filing on Phase II implementation.

## **Appendix B**

### **Current Phase II Implementation Schedule**

ID		Task Name	Start	Finish	99		
					Qtr 3	Qtr 4	Qtr 1
1		Project Planning, RFI/Technology Selection, RFP/Vendor Selection	Wed 09/15/99	Fri 09/29/00			
2		MSM 3300 ASIC available from Qualcomm QCT: Engineering Samples to Production Quantities	Thu 08/17/00	Fri 12/29/00			
3		<b>Mandated Milestone: Submit Detailed Plan to FCC</b>	Mon 10/02/00	Thu 11/09/00			
4		MPC and PDE to be delivered to Sprint PCS test lab	Mon 12/04/00	Fri 12/29/00			
5		Lucent MSC/BSC software to be delivered to Sprint PCS Test lab.	Tue 01/23/01	Tue 01/23/01			
6		IS-801 Interoperability testing for both AFLT & Assisted GPS at Sprint PCS Test Lab	Tue 01/23/01	Mon 06/04/01			
7		MSM 5100 ASIC available from Qualcomm QCT: Engineering Samples to Production Quantities	Thu 03/15/01	Mon 07/16/01			
8		Nortel BSC/MSC software to be delivered to Spint PCS test lab	Wed 05/30/01	Wed 05/30/01			
9		First Lucent Market Application for PDE & MPC	Mon 07/02/01	Fri 11/02/01			
10		First Nortel Market Application for PDE & MPC	Tue 09/04/01	Thu 01/31/02			
11		Nationwide deployment of MSC/BSC software.	Mon 10/01/01	Sat 06/15/02			
12		First ALI Capable handset Launch	Mon 10/01/01	Mon 10/01/01			
13		<b>Mandated Milestone: First ALI Capable Mobile sold: Ramp up to 25%</b>	Mon 10/01/01	Mon 12/31/01			
14		<b>Mandated Milestone: ALI Capable Handset sales increase from 25% to 50 %</b>	Tue 01/01/02	Sun 06/30/02			
15		First MSM 5100 (Qualcomm ASIC) ALI Capable handset Launch	Fri 03/01/02	Mon 06/03/02			
16		<b>Mandated Milestone: ALI Capable Handset sales increase from 50% to 100 %</b>	Mon 07/01/02	Tue 12/31/02			





- 1 **Project Planning, RFI/Technology Selection, RFP/Vendor Selection**  
Sprint PCS cross-functional Position Location Team produced a Request for Information (RFI) to vendors for position location technology.  
The RFI responses led to the selection of the technology.  
This led to the formation of the Request for Proposal (RFP).  
The RFP responses led to Vendor selections.
- 2 **MSM 3300 ASIC available from Qualcomm QCT: Engineering Samples to Production Quantities**  
Qualcomm QCT provided engineering samples of the CDMA 2nd Generation, GPS Capable ASIC to handset manufacturers on 8/17/2000. Reference software has been provided to licensees, but it does not support AFLT, Assisted GPS, or IS-801 as of this filing. Production quantities and final reference software, as well as the RFR3300 rf module, is scheduled for delivery to handset manufacturers no later than 12/29/2000.
- 3 **Mandated Milestone: Submit Detailed Plan to FCC**  
Reference the FCC's FOURTH MEMORANDUM OPINION AND ORDER Released September 8, 2000 (FCC 00-326)
- 4 **MPC and PDE to be delivered to Sprint PCS test lab**  
MPC is planned for delivery first in this interval. Prototype PDE is planned for delivery towards the end of this interval. Production PDE is planned for delivery 4/13/01 through 4/30/01.
- 5 **Lucent MSC/BSC software to be delivered to Sprint PCS Test lab.**  
Sprint PCS accepts delivery of Lucent's MSC/BSC software at the test laboratory.
- 6 **IS-801 Interoperability testing for both AFLT & Assisted GPS at Sprint PCS Test Lab**  
Interoperability testing for IS-801 is critical to the launch of ALI capable handsets, the PDE, MPC, BSCs, and MSCs. A cooperative effort to co-develop and implement IS-801 was started with our network vendors and several handset manufacturers in July of 2000.
- 7 **MSM 5100 ASIC available from Qualcomm QCT: Engineering Samples to Production Quantities**  
Qualcomm QCT will provide engineering samples of the CDMA 3rd Generation, GPS capable ASIC to handset manufacturers by 3/15/2001. Production quantities and final reference software is scheduled for delivery to handset manufacturers no later than 7/15/2001.
- 9 **First Lucent Market Application for PDE & MPC**  
After system integration is complete, a test/trial period will be executed to load and stress the system in one or more market areas. PSAP interoperability testing is planned.
- 11 **Nationwide deployment of MSC/BSC software.**  
After successful integration and system loading is complete, systems are turned up by market as rollout resources allow. This will include Lucent, Nortel, and Motorola MSC/BSC software.
- 12 **First ALI Capable handset Launch**  
The first ALI mobile product to be introduced into the market.
- 13 **Mandated Milestone: First ALI Capable Mobile sold: Ramp up to 25%**  
Reference the FCC's FOURTH MEMORANDUM OPINION AND ORDER Released September 8, 2000 (FCC 00-326)
- 14 **Mandated Milestone: ALI Capable Handset sales increase from 25% to 50 %**  
Reference the FCC's FOURTH MEMORANDUM OPINION AND ORDER Released September 8, 2000 (FCC 00-326)
- 15 **First MSM 5100 (Qualcomm ASIC) ALI Capable handset Launch**  
It is unknown which Sprint PCS handset manufacturer will be the first to launch an MSM 5100 based handset. All Qualcomm Licensees are considering the MSM 5100 platform for deployment on 3G networks.
- 16 **Mandated Milestone: ALI Capable Handset sales increase from 50% to 100 %**  
Reference the FCC's FOURTH MEMORANDUM OPINION AND ORDER Released September 8, 2000 (FCC 00-326)

## CERTIFICATE OF SERVICE

I, Anthony Traini, hereby certify on that on this 9<sup>th</sup> day of November 2000, I served a copy of the foregoing Joint Sprint PCS Phase II Implementation Report by U.S. first-class mail, or by hand delivery as indicated with an \*, to the following persons:

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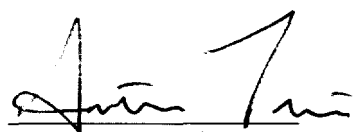
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